Due: Wednesday, October 23

HMC Math 142 Midterm Exam Fall 2017

Prof. Gu

October 4, 2017

Note: Your work on this midterm project starts on October 11. There will be no homework for the week starting Oct 11, instead you are supposed to work on this midterm project. Official Exam Date is October 18. There is no class on that day and you are expected to work out all the details of the project by 2:30 pm on October 18. The rest of the time is for you to put your work details into a term project report and prepare slides for your work to be presented in the week of 23. You are encouraged to start this project as early as possible.

You must write a paper consisting of both a theoretical part and an applied part. The lengths of these two sections doesn't matter as long as they are both present, and that the total page length of the paper is at least 6-8 pages. An acceptable length of the paper will be determined by your previous homework choice (please indicate below which one you had chosen). If you had chosen choice 1 you are required 8 pages, If you had chosen choice 2, required 6 pages, If you had chosen choice 3, required 7 pages. The paper needs to utilize concepts in differential geometry or manifold theory. You are encouraged to look at published research articles, textbooks, or other online material/publications, as long as using certain differential geometric techniques. (e.g. Many of the topics in Information Geometry or Theoretic fisics using differential geometry). You are more than welcome to present your own original research if you like as well.

Please circle one of the following for the homework 6 you had chosen. Please turn in this paper as your cover sheet for your midterm exam. Thanks!

1. Choose a project of your preference. Write 2 pages of your work of the project that could be background sections, introduction, development or implementation of an algorithm or a model, some theorems, etc. Identify at least one or a couple research articles.

2. Choose to work on homework problems. Work on part B, and choose 3 problems that interest you from part C to write up. Keys for part C are attached in resources.

3. Choose half and half. Choose two problems from choice 2 (you can either choose 2 problems from part C or you can choose 1 problem on part C and works out the problem in part B) and one page of work on choice 1